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Karen Cibulskis
Remedial Project Manager
United States Environmental Protection Agency
Region V
77 West Jackson Boulevard
Mail Code SR-6J
Chicago, IL 60604

Dear Karen:

Re: Landfill Gas / Soil Vapor Investigation Letter Work Plan
South Dayton Dump and Landfill Site, Moraine, Ohio (Site)

This Letter Work Plan presents the South Dayton Dump and Landfill Potentially Responsible Party Group's (PRP Group's) Work Plan for a landfill gas (LFG) and soil vapor investigation at the Site. A Site plan with proposed LFG / soil vapor sampling probe locations is providedon Figure 1. This work will help address data gaps and provide information to aid in the completion of a Feasibility Study (FS). All work will be performed in accordance with the United States Environmental Protection Agency (USEPA)-approved Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), and Site-Specific Health and Safety Plan (HASP).

The PRP Group has prepared this Letter Work Plan based on the discussions between the PRP Group and USEPA in February 2008. The Letter Work Plan incorporates comments received from USEPA on May 7 and 28, 2008.

The objectives of this Letter Work Plan are to:

1. assess the presence of LFG and soil vapor at locations within the Site (pressure, methane, lower explosive limit (LEL), carbon dioxide and oxygen; and other chemicals at the detection limits listed in Table 1);
2. obtain current data in locations where historic information indicated potential landfill gas generation concerns;
3. develop information to assist in calculating future landfill gas generation rates for the FS. Four of the 20 gas probes are located within the limits of the Preliminary Direct Contact Risk – Presumptive Remedy Area (DC-PRA) and will provide information with respect to LFG / soil vapor generation within known municipal waste landfill areas. The scope and location of the gas probes has also taken the closest receptors into consideration. A total of 14 gas probe locations are proposed for installation along

Dryden Road. Twelve of the sixteen gas probes are located on commercial properties within 50 feet of occupied structures on Dryden Road. These gas probes will provide data with respect to the risk to occupants of adjacent buildings from LFG and soil vapor migration from the Site; and

4. develop information to assist in evaluating the need for and type of landfill gas control at the Site for the FS.

LANDFILL GAS / SOIL VAPOR INVESTIGATION

Gas probes will be installed to evaluate LFG and soil vapor concentrations within the Site, including the properties along Dryden Road. Twenty gas probes will be installed. Gas probe locations are presented on Figure 1. The procedures for installation of the gas probes are described below.

Five gas probes will be installed in the central portion of the Site (four within the DC-PRA) to evaluate the presence of methane and non-methane organic compounds (NMOC) in the zone where the LFG / soil vapors will most readily migrate at these locations. Three gas probes will be installed in the vicinity of the former underground storage tank removals and the Valley Asphalt drum removal area to assess landfill gas and soil vapor quality in the zone where the LFG / soil vapors will most readily migrate at these locations.

Fourteen of the gas probes are proposed to be installed on or adjacent to the Site boundary and in the vicinity of the commercial properties and structures along Dryden Road and west of East River Road to assess LFG and soil vapor quality in the zone where the LFG / soil vapors will most readily migrate and, if present, would pose the greatest risk to any occupants of the buildings at these locations.

GAS PROBE INSTALLATION

Gas probes will be installed using a 50-mm (2-inch) diameter Geoprobe dual-tube direct push technique to minimize formation disturbance. The borehole for each gas probe will be advanced to a target depth in the unsaturated zone (a maximum of 20 feet below ground surface or 2 feet above the water table, whichever occurs first).

Soil and fill materials encountered will be logged. The soil log information recorded will include a visual description of the types of material (i.e., undisturbed native soil, spoils from quarry operations, domestic refuse, industrial refuse, metallic debris, ash, fly ash, construction and demolition debris, foundry sand, asphalt, slag, or other appropriate description) and, if

possible, a Unified Soil Classification System (USCS) description. Native soils will be logged using the USCS by CRA's staff. A photograph of each core sample collected will be taken and a photographic log will be documented in the field notes. Should groundwater be encountered in any borehole, the tube will be pulled up a minimum of 2 feet above the water table. The void that is formed when the tube is pulled will be filled using No. 3 silica sand. The groundwater elevation of the nearest monitoring well will be used to determine the targeted depth of the borehole for the gas probes.

LFG and soil vapor will not preferentially migrate through discrete intervals of fill material at the Site unless impermeable layers are present between the discrete intervals of fill material. Based on the available Site geological data, intervals that are impermeable to LFG / soil vapor have not been identified. Further, LFG and soil vapor migration to ambient air or into a building will occur from the shallow soil horizon. Accordingly, the screened interval of the gas probes will be installed in soil strata with a notably higher permeability than the surrounding geologic strata. The gas probe screen will be set as shallow as possible within the higher permeability stratum. In order to prevent short circuiting of ambient air into the gas probe and, consequently, dilution of LFG / soil vapor samples, the top of the gas probe screen will be installed a minimum of three feet below ground surface. The final depth of the gas probe screen will be dependent on the conditions observed at each location and will be determined in the field. The proposed soil vapor sampling program has been established to collect and analyze LFG / soil vapor samples that are representative of soil vapor quality in the most permeable zone in the vicinity of the probe, which is the zone where LFG and NMOC will migrate. If these soil borings encounter multiple, discrete permeable zones that appear to have vastly different LFG / soil vapor impacts based on field screening, then CRA will either consult with USEPA's field representatives and install more than one gas probe at that location or identify that area as potentially requiring additional characterization in later stages of investigation at the Site.

The average depth of the unsaturated zone across the Site is approximately 20 feet bgs; therefore, a target maximum depth of 20 feet bgs is based on the need to place the gas probes in the unsaturated zone near the surface where LFG / soil vapor, if present, will diffuse and migrate.

The purpose of this investigation is to assess the migration potential and generation rate(s) of methane and NMOC in the soil gas. If gas probes are installed in the 2-foot interval above the water table, the gas probes will periodically be saturated and will not generate meaningful data. The proposed gas probe locations will also address LFG / soil vapor concentrations near potential receptors.

The screened interval will be selected based on field observations that will identify the presence of landfill materials or, in the absence of such materials, a comparatively permeable region in

the unsaturated zone that would be expected to transmit LFG and/or soil vapor. The selection of the most permeable zone will be based on soil descriptions and characterizations using the Unified Soil Classification System (USCS). The gas probe sampling and screened interval selection details are summarized in the Field Sampling Plan (FSP), CRA May 2008. Where landfilled materials are present, the screen will be placed at a depth immediately above the landfilled materials. If the landfilled material extends to within three feet of the surface and it is, therefore, not possible to set the screen above the landfilled material, the screen will be placed within the landfilled material.

The gas probes will be completed using 13-mm (0.5-inch) diameter schedule 40 PVC continuous piping (i.e., no joints) with a screened interval length of 0.3 meters (1 foot). The void space between the screened interval and formation will be filled with No. 3 silica sand (i.e., sand pack) to approximately 0.2 meters (8 inches) above the top of the screened interval. One foot of dry granular bentonite will be placed on top of the sand pack and then hydrated bentonite will be placed to just below ground surface. The sand pack and bentonite seal will be placed as the Geoprobe is withdrawn to ensure that the formation does not collapse around the screened interval or riser. A lockable surface casing will be set in concrete at the ground surface around each gas probe. The gas probe completion details are summarized in the FSP. The gas probe stratigraphic and instrumentation logs are presented in the FSP.

Soil samples will be collected from the surface and subsurface during the gas probe installation for the analysis of soil physical properties (i.e., grain size analyses, fraction of organic carbon content, plasticity index, porosity, permeability, and Atterburg limits). The procedures for collecting soil samples are presented in the FSP.

LANDFILL GAS/SOIL VAPOR SAMPLING

CRA will complete two rounds of sampling. The sampling will consist of:

i) measurement of gas pressure;
ii) screening for methane (v/v), LEL, and oxygen (v/v); and
iii) collection of Summa™ canister samples for VOC analysis.

The initial LFG/soil vapor sampling will be conducted one week following the installation of gas probes. One week is considered to be more than sufficient time for any formation disturbances created by drilling activities to dissipate and for equilibrium conditions to be reestablished in the unsaturated zone. As a result, the soil vapor samples are considered representative of conditions in the sampled intervals at the time the samples are collected. The three sampling elements are described below.

i) Measurement of Gas Pressure

A pressure gauge will be attached to the hose barb on the LFG probe to measure the static gas pressure. The pressure gauge will be sufficiently sensitive to record gas pressure to 0.1 pounds per square inch (psig). The highest value obtained during gas pressure readings will be recorded. The ambient barometric pressure will be recorded at each gas probe when soil gas pressure readings are being taken. The ambient barometric trends will also be noted (i.e., rising, falling, steady).

Two rounds of gas pressure measurements will be collected, separated by at least one month.

ii) Screen for Methane, LEL, Carbon Dioxide, and Oxygen

A Multimeter will be used to draw a sample from each probe to measure and record the methane, LEL, carbon dioxide, and oxygen readings. The highest values obtained during sampling will be recorded. The ambient and soil gas temperatures will be recorded at each gas probe when soil gas readings are being taken. The ambient barometric trends also will be noted (i.e., rising, falling, or steady).

Two rounds of this sampling will be completed, separated by at least one month.

The details regarding the calibration and maintenance frequency and procedures, instrument start up procedures, and recording of data for instruments used during the installation and sampling of the gas probes will be provided in the FSP. These instruments include PIDs, Multimeters, barometers, and thermometers. The FSP will specify gas probe purging rates and procedures. A copy of the supplier instrument calibration will be available for review in the field. All field calibration procedures and readings will be documented in the field logbook.

iii) Summa™ Canisters

One round of soil vapor samples will be collected during the first round of methane measurements using 6-liter capacity Summa™ canisters fitted with a laboratory calibrated critical orifice flow regulation device sized to allow the collection of the soil vapor sample over a 1-hour sample collection time. The 1-hour sample collection time for a 6-liter capacity Summa™ canister corresponds to a maximum soil vapor sample collection flow rate of approximately 200 milliliters per minute (mL / min). This soil vapor sample collection flow rate corresponds to the maximum flow rate recommended in the soil vapor sampling protocol recently developed by the California Environmental Protection Agency (CalEPA) (CalEPA, 2003). A maximum flow rate of 200 mL / min is recommended to limit VOC stripping from soil,

and prevent the short-circuiting of ambient air from ground surface that would dilute the soil vapor sample. The low flow rate of 200 mL/min will increase the likelihood that a sample representative of in situ conditions is obtained. Prior to sample collection, gas probe purging will be conducted at a maximum flow rate of 200 mL/min. Three gas probe volumes (calculated based on casing and sand pack volume) will be purged to remove potentially stagnant air from the internal volume of the gas probe. The FSP provides the soil gas purging and sampling procedures including the calculation of purge volume, maximum purge volume and maximum purging rates. Once the flow rate is set for a canister, the time it will take to fill up the canister will be calculated and the sampler will retrieve the canister and turn off the flow at the calculated time to prevent the valve from being open after the canister is filled.

The Summa™ canister samples will be analyzed for VOCs using USEPA method TO-15. The VOCs included in USEPA method TO-15 (with the addition of naphthalene) and the best method detection limits that the contract laboratory can achieve are listed in Table1. The laboratory's ability to achieve the best possible detection limits will be highly dependent on the presence of matrix interferences.

Quality assurance / quality control (QA/QC) measures to be implemented during the soil vapor sampling event include maintaining a minimum negative pressure in the Summa™ canisters following sample collection, collection of one field duplicate sample, collection of an ambient air sample, and the analysis of a trip blank Summa™ canister. Further details regarding the gas probe sampling protocol and the applied QA/QC measures are presented in the FSP.

SCHEDULE

The LFG and soil vapor investigation will begin within four weeks of USEPA approval of this Letter Work Plan, or the relevant sections of the Field Sampling Plan and Quality Assurance Project Plan, or USEPA's review of the Health and Safety Plan, whichever occurs later and following completion of clearing and grubbing activities and, if scheduling permits, test pitting and test trenching activities. The LFG and soil vapor investigation will be completed over a two-week period. The second LFG sampling event (gas pressure, methane, LEL, and oxygen) will occur within six weeks of the first sampling event. The PRP Group will provide the USEPA with verbal notification at least 15 days in advance of the initiation of this activity.

All work will be performed in accordance with the FSP, QAPP, and HASP, pending USEPA's approval of the relevant sections of these documents.

REPORTING

The results of the LFG and soil vapor investigation and analytical results willbe summarized and presented in a technical memorandum. The memorandum will include a description of the fieldwork completed, any deviations from the proposed work, and the rationale behind the change, and photographs taken during the investigation. Figures detailing the actual installations, analytical summary tables, iso-concentration maps, and analytical data reports will also be included in the technical memorandum. The technical memorandum will be provided to the USEPA within one month of the completion of the proposed work. The data will be used in the FS and to assist in identifying potential areas where further investigation or assessment may be appropriate.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Stephen M. Quigley

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Encl.

c.c. Matt Mankowski, USEPA (PDF)
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0 200 400ft

APPROXIMATE LOCATION OF DRUM REMOVAL IN 2000

FORMER LOCATION OF DAYTON RECYCLING USTs

APPROXIMATE LOCATION OF FORMER CUSTOM DELIVERY UST AREA

FORMER AIR CURTAIN DESTRUCTOR

RECREATIONAL TRAIL

GREAT MIAMI RIVER

DRYDEN ROAD

LARGE POND

SMALL POND

QUARRY POND

MW-206 MW-201 MW-103 MW-102 MW-101A MW-204 MW-203 MW-210 MW-212 MW-209 MW-208 MW-202 MW-104* MW-207

LEGEND

MW-206 ● INTERMEDIATE ZONE MONITORING WELL LOCATION

SITE BOUNDARY (SOW 2006)

PRELIMINARY DIRECT CONTACT RISK PRESUMPTIVE REMEDY AREA

EDGE OF WATER

PROPOSED LANDFILL GAS PROBE LOCATION

* APPROXIMATE LOCATION

SOURCES:
THE PAYNE FIRM, INC., PROJECT 0279.44.05, FIGURE 1, DATED 9/12/05;
TETRA TECH EM INC., PROJECT L0312006-SOUTH DAYTON DUMP, FIGURE 2, SITE LAYOUT, 05/25/2004;
USGS AERIAL PHOTOGRAPH, DAYTON SOUTH, 1994.

figure 1

SOIL GAS PROBE LOCATIONS
SOUTH DAYTON DUMP AND LANDFILL SITE
Moraine, Ohio

38443-00(CIBU023)GN-WA001 JUN 11/2008

TABLE 1

SOIL GAS PARAMETER LISTS AND TARGETED QUANTITATION LIMITS
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SOUTH DAYTON DUMP AND LANDFILL
MORAINE, OHIO

Parameter	***Targeted Quantitation Limit (TQL)*** [1]	***Method Detection Limits (MDL)*** [2]	*OSWER Draft Guidance* ***Targeted Soil Gas Concentrations*** [3]
	Air	***Air***	***Risk = 1 × 10^{-4}***
Compound	***(µg/M^3)***	***(µg/M^3)***	***(µg/M^3)***
Select Volatile Organic Compounds (VOC)			
Acetone	24	5.9	3,500
Benzene	9.6	0.64	310
Bromodichloromethane	13	1.6	140
Bromoform	21	2.1	2,200
Bromomethane	16	7.8	N / A
2-Butanone	29	5.9	N / A
Carbon disulfide	31	6.2	7,000
Carbon tetrachloride	13	1.3	160
Chlorobenzene	9.2	0.92	600
Chloroethane	10	1.0	100,000
Chloroform	9.8	0.97	110
Chloromethane	8.2	0.82	N / A
Cyclohexane	6.9	1.4	N / A
Dibromochloromethane	17	1	N / A
1,2-Dibromo-3-chloropropane	96	3.9	2
1,2-Dibromoethane	15	1.5	2
1,2-Dichlorobenzene	12	1.2	2,000
1,3-Dichlorobenzene	12	1.2	1,100
1,4-Dichlorobenzene	36	1.2	8,000
Dichlorodifluoromethane	9.9	0.99	2,000
1,1-Dichloroethane	8.1	0.81	5,000
1,2-Dichloroethane	8.1	4.0	94
1,1-Dichloroethene	7.9	4.0	2,000
cis-1,2-Dichloroethene	7.9	3.2	N / A
trans-1,2-Dichloroethene	7.9	4.0	N / A
1,2-Dichloropropane	14	6.9	40
cis-1,3-Dichloropropene	14	0.91	200
trans-1,3-Dichloropropene	9.1	0.91	200
Ethylbenzene	8.7	0.87	2,200
2-Hexanone	41	1.6	N / A
Isopropylbenzene	9.8	2.0	N / A
Methylene chloride	6.9	0.69	5,200
4-Methyl-2-pentanone	41	8.2	N / A
Methyl tert-butyl ether	7.2	3.6	N / A
Naphthalene	2.6	1.3	N / A
Styrene	8.5	0.85	10,000
1,1,2,2-Tetrachloroethane	14	6.8	42
Tetrachloroethene	14	1.4	810
Toluene	7.5	3.8	4,000
1,2,4-Trichlorobenzene	37	18	2,000
1,1,1-Trichloroethane	11	1.1	22,000

TABLE 1

SOIL GAS PARAMETER LISTS AND TARGETED QUANTITATION LIMITS
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SOUTH DAYTON DUMP AND LANDFILL
MORAINE, OHIO

Parameter	*Targeted Quantitation Limit (TQL)* [1]	*Method Detection Limits (MDL)* [2]	*OSWER Draft Guidance*
Compound	*Air ($\mu g/M^3$)*	*Air ($\mu g/M^3$)*	
Select VOC (continued)			
1,1,2-Trichloroethane	11	1.1	150
Trichloroethene	11	1.1	22
Trichlorofluoromethane	11	5.6	7,000
1,1,2-Trichloro-1,2,2-trifluoroethane	15	3.1	300,000
Vinyl chloride	7.6	3.8	280
Xylenes (total)	17	4.3	N / A

Notes:

[1] - Please note that these are targeted quantitation limits and are presented for guidance only. Actual quantitation limits are highly matrix dependent and may be elevated due to matrix effects, QA / QC problems and high concentrations of target and non-target analytes.

[2] - Method Detection Limits (MDL) are also presented for guidance only. Actual MDLs will vary depending on sample specific preparation factors. The MDLs are also highly matrix dependant and may be elevated due to matrix effects, QA / QC problems and high concentrations of target and non-target analytes. Laboratory MDLs are updated on a periodic basis and the MDLs in effect when the samples are analyzed will be used for reporting purposes.

[3] - Target Shallow Soil Gas Concentrations Corresponding to Target Indoor Air Concentrations Where the Soil Gas to Indoor Air Attenuation Factor = 0.1 in Table 2a (Risk = 1×10^{-4}) of draft guidance "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (USEPA, 2002).